

Innovations in Energy Productivity: a novel use for “waste cold”

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SUSTAINABLE ENERGY FOR ALL



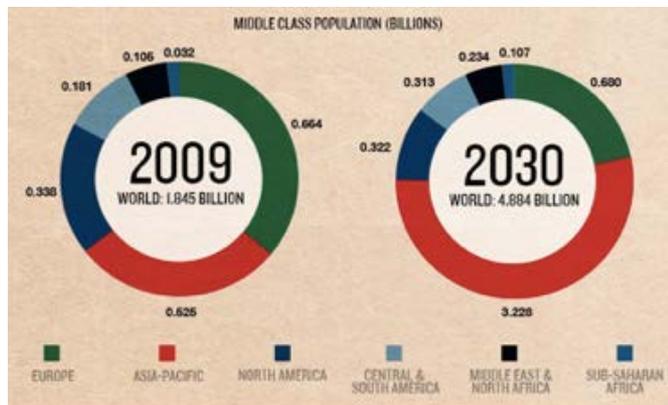


Why Raise Energy Productivity?

- Massive improvements in energy efficiency needed to cope with economic growth
- Increase in renewable energy investment will still leave a gap for use of fossil fuels, which must be used as cleanly as possible. Reduction of waste in production, transmission and distribution of ALL energy sources
- Need to transform thinking from delivery of energy to delivery of services



Cooling: a market with two extremes



Asian Pacific middle class could grow six-fold to 3.2 billion in 2030

Spending power could rise from \$5 trillion to \$33 trillion.

Built on cooling



More than 1 billion people continue to live in extreme poverty, and more than 75 per cent of them reside in rural areas and are primarily dependent on agricultural production.

40% of food is lost post-harvest because of lack of cooling; 800M go to bed hungry

2M die per year from lack of cold chain for vaccines



We need to provide cooling in a smarter way

It is crucial that the primary energy demand for providing cooling does not grow at the same rate as cooling demand itself.

There is a need to re-shape the way we address cold needs – system approach

- We need to start with the services required, not simply the electrical demand
- We must think about sources and uses of waste cold



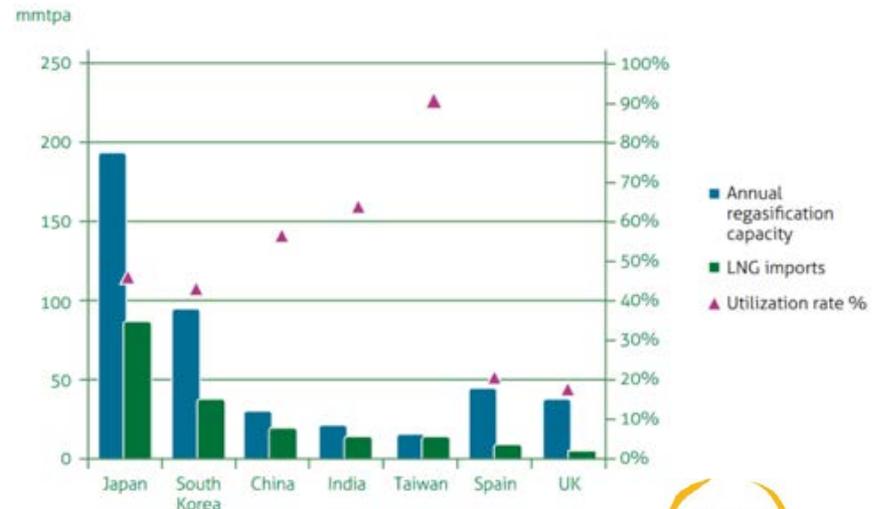
What is “Waste Cold”

Of the 111 LNG import terminals worldwide, only 23 undertake any form of cold recovery.



Even here the use of the waste cold is usually limited to industrial plants close to the terminal, and only at times when LNG is actually being regasified, which in many cases occurs only intermittently.

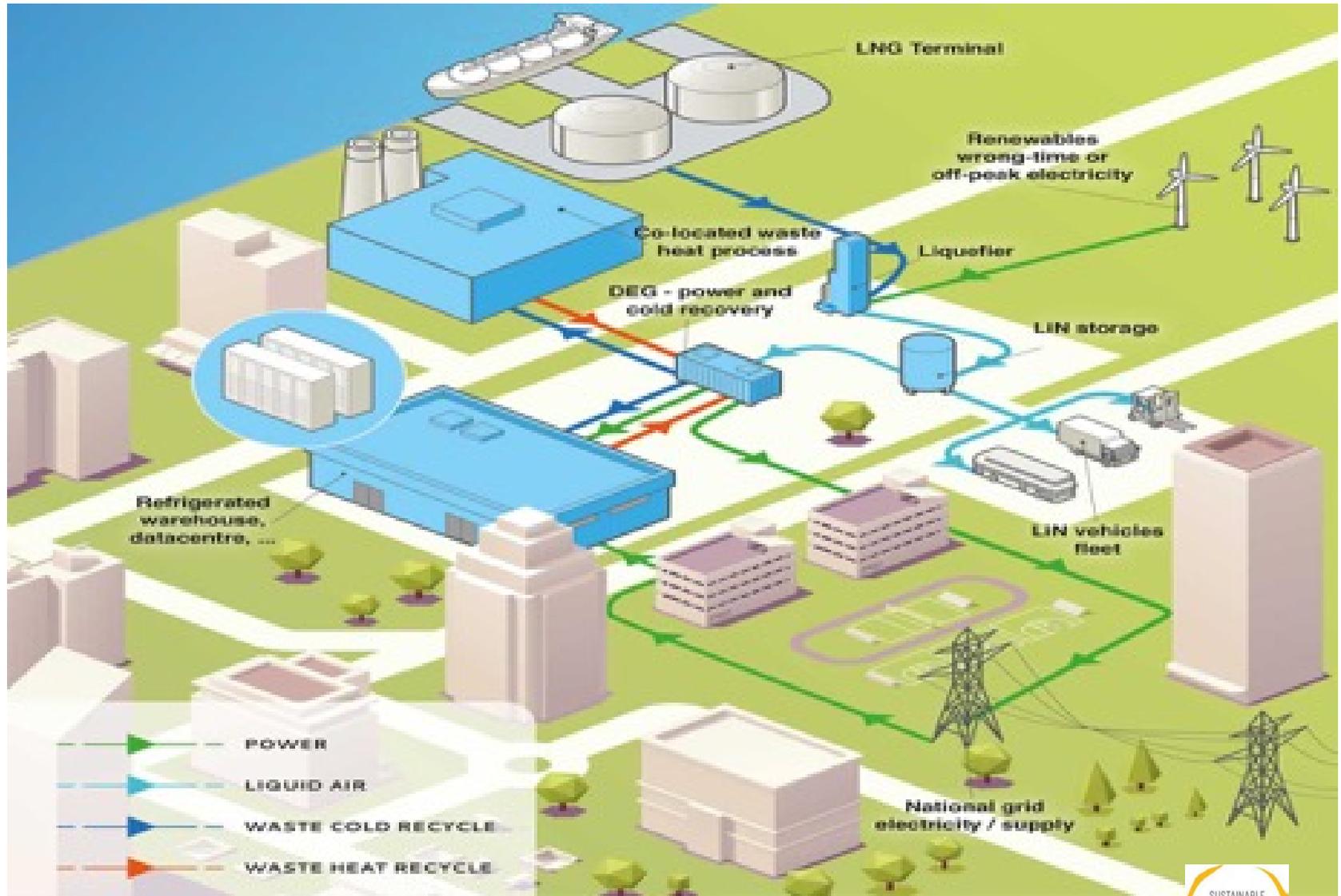
Global LNG regasification capacity & utilisation



Source: GIIGNL, The LNG Industry in 2013



System approach to cold



Source: University of Birmingham, UK



Impacts of harnessing the 'packaging' of LNG

- ✓ Extract maximum value from heavily capital intensive investments in LNG infrastructure
 - ✓ CO2 reductions
 - ✓ Environmental and social benefits
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- Projected global trade of 500M tons by 2025
 - recycling this waste cold could generate more than \$50 per ton in economic and social benefits.
 - In volume terms, could produce all cooling of today's refrigerated transport fleet
 - **Question is how much can we capture?**



How do we make this happen and the Role of the IEF

- IEF to champion even more the concepts of energy efficiency and energy productivity
- More feasibility work to establish the business case in different markets. The principles of waste cold recovery are not new but uptake is poor
- Support from national governments to support research, development and demonstration of schemes
- Regulatory regimes that recognize the potential of such schemes as equally valid compared with other “greening electricity” schemes
- Novel partnerships that bring together suppliers and buyers of cold
- More investigation to find similar examples of untapped opportunity
- Broad dissemination of these examples at international fora





GOING FURTHER, FASTER – TOGETHER

